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ABSTRACT

The electronic newspaper, using a television screen and a small keying mechanism to call for specific pages of interest, currently exists in England and may soon be common in the United States. Three systems of electronic information delivery (teletext) now operate in England: CEEFAX, ORACLE, and VIEWDATA. The first two make use of two television lines at the top of a home television screen and the viewer can call up the page of his or her topic of interest. The third system is operated by the British Post Office and displays information in the same way; however, specific information can be sought through a two-way communication system using a telephone connected to the television set. Development of the system in the United States awaits only a commercial developer and the approval of the Federal Communications Commission. The advertising potential of the teletext systems makes it likely that they will be developed by commercial enterprises while the convenience and probable low cost may make such systems very popular with the United States public. (TJ)

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NEWSPAPER DIVISION

ELECTRONIC NEWS DELIVERY

NEEDS ONLY FCC ENCOURAGEMENT FOR INVASION OF U.S.A.

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ELECTRONIC NEWS DELIVERY NEEDS ONLY FCC ENCOURAGEMENT FOR INVASION OF U.S.A.

Scientists, prophets and other men of vision have been saying for at least ten years that "electronic newspapers" would be available in our homes someday, possibly in the 1990s. This development will be a part, they say, of the impending days of "future shock."

But those dreamers and scientists are all wrong about one thing, at least. The day of "electronic newspspers" is no longer something to anticipate.

The best informed publisher in England said last summer, "We had better stop thinking of the electronic newspaper as a dream of the future because it has already been with us for at least two years." This publisher ought to know. The electronic newspaper is his lastest competitor.(1)

How serious is this threat to the economic future of newspapers? How soon will journalism schools need to revise their thinking to include a new communications medium as one for which they must prepare their graduates?

There is no positive answer to either question -- but the best answer for the second question appears to be: "Right away." And some schools are already beginning to add information to their courses about the potentials existing -- and already demonstrated -- in the rapidly expanding versions of British teletext.

Another unquestionable fact can be learned from the English experience of adding electronic information delivery to home television screens: We need to stop thinking of that cathode ray tube in our living room as an instrument for entertainment called a television screen. In England, that tube has become an information screen, instead. And it will certainly happen in the United States, as well.(2)

Think about it: When your bank teller looks at a check, he may also scan an information screen to see whether your account has enough money to pay that check. He reads words and fighres in "print" on a video display terminal or VDT.

In many American newsrooms today, a reporter writes a story on a similar screen; then sends it along its way for paste-up, plating and printing. His English counterpart writes a similar story on a similar screen but then something different happens if he is operating one of the new British "teletext" systems: The English reporter presses a button and his words are instantly readable in electronic print on every teletext set in Great Britain![3]

The British writer by-passes both printing and delivery. His video display unit is matched by similar VDTs in the homes of his readers, and they can instantaneously read his story. The new teletext technology has changed the picture tube in a living room into an information screen.

"Teletext" is the generic name for three British systems of electronic information delivery -- CEEFAX, ORACLE and VIEWDATA. Teletext is electronic "print" that is readable with a maximum of 24 lines on a glass screen. It looks something like the print that reporters type out on video display units in modern American newsrooms.

Teletext ceased to be regarded as "experimental" with final government approval in Great Britain more than a year ago.[4] It has already established some beachheads for an American invasion.[5] There is ample reason to believe that legal status and encouragement from the Federal Communications Commission is the only remaining barrier toward teletext becoming a living reality in American life.

HISTORICAL BACKGROUND

When this writer visited England in May, 1977, to check on teletext development (as an extension of earlier research on the future of newspapers), there wasn't much to see. There were only about 3,000 operating teletext receivers, most of them home-made, in the entire country.[6]

A visit to the Texas Instruments factory in Bedford confirmed, however, that this factory was already beginning to turn out teletext decoders in considerable volume. By The end of 1977, the American-owned British company was turning out 3,000 sets a month, more than the total in all of England six months earlier.(7)

The American effort, costing more than a half million dollars, was a part of Texas Instruments' ultimate goal: that of seeing a full-scale computer installed in every home in America. But in the field of teletext, all the action was still in England last May.(8)

The British Broadcasting Company announced the development of its CEEFAX system late in 1972.

The BBC, Independent Broadcasting Authority (now called ITV) and British Radio Equipment Manufacturers' Association (BREMA) announced agreement upon a unified standard for teletext equipment specifications in March, 1974.

Experiments continued and several equipment exhibitions and colloquia exhibited and sparked discussions about teletext through 1975 and 1976 before the British government announced its full approval for the systems in November, 1976.

British manufacturers still held off, however, awaiting the full report of Lord Annan's Committee on the Future of Broadcasting. And when that report was favorable last Spring, British companies, too, put aside their apprehension about the future of teletext (and the British economy) to try to catch up with Texas Instruments.

Last Fall, competitive versions of teletext receivers with British trade names began appearing at Trade Fairs and in the important High Street radio and TV shops in London. This was the result of agreement upon manufacturing specifications followed by official government approval of the systems.

In England, 75% of television viewers rent rather than buy their sets. Radio Rentals, with 70% of the rental business, began in October to exhibit teletext units in each of its numerous rental and repair shops. The company expects thousands of customers to exchange their old sets, costing $9.00 a month, for teletext sets renting for about $15.00. A single London hotel (the Portman) recently leased 100 teletext sets for its tenants.(9)

WHERE IS TELETEXT GOING?

What have these developments brought about in numbers of teletext sets in operation? How many are expected?

By the end of 1977, estimates of the number in operation ranged from 30,000 to 50,000.(10)

An independent consulting firm earlier had forecast that 4 million sets will be in use in England by the end of 1982 and 7.5 million by 1985. Garry Garrard of Texas Instruments expects usage to reach 300,000 by the end of 1978. This projection assumes replacement of 250,000 old sets with teletext-equipped models and another 50,000 being purchased as second sets.(7) Colin McIntyre, CEEFAX editor, believes these estimates may be too optimistic,(10) but the new enthusiasm of British manufacturers shows their belief that usage will expand rapidly despite the $2,000 price tag for color sets equipped for teletext. The price is falling now, of course.

ADVERTISING POSSIBILITIES

What are the advertising potentials on the wired VIEWDATA system, which most worries British publishers, and on the broadcast ITV stations which accept advertising?

Christopher Lorenz, a writer for the Financial Times has predicted, "Our lifeline, classified advertising, may change radically."(11)

Martin Hedges, writer for a British advertising trade journal has said that regional newspapers alone stand to lose $44 million in revenue yearly if ORACLE (ITV) succeeds.(11)

The Newspaper Society, which represents the local press, made a strong presentation to the Annan Commission asking that teletext development be delayed for five years. The Commission report said the society "believed rapid development of teletext would be crippling in it's financial consequences for the newspaper industry."(12)

The Society, in a letter to this writer March 21, observed ruefully that "the Commission did not pay a great deal of attention to what we suggested.... The Society has not given up hope and will continue making representations to the Government. I may well have more to report to you by summer."(13)

The chief operating executive of the Westminster Press, John Beverly, says he believes the wired VIEWDATA system, particularly, will become a serious threat to the classified revenues of his organization's 12 daily and 55 weekly newspapers.(14) He believes teletext will force substantial changes in the news-editorial content of newspapers, but he does NOT think it will put his papers out of business.

Perhaps most worried of all are television executives, who foresee the possibility that television viewers will switch from conventional viewing on TV to teletext whenever the TV commercials come on.(15) This possibility prompted Lord Grade, head of ITV network, to comment, "We need teletext like I need a hole in my head." (Several sources quoted him thus.)

Geoffrey Hughes, ITV's ORACLE editor, declared the company would not have invested the huge sums of money for the present extremely small ad revenue, if it had not expected to make money from advertising in four or five years."(16)

Retail display advertising is a much smaller portion of total revenue for British newspapers than it is for papers in America and Canada. This has prompted

more optimism about the continuation of display ads in British newspapers.

Several publishers and a TV executive all expressed opinions that teletext would not attract much display advertising. "Display advertising is by its nature intrusive," said John Beverley, "so people will not look for it, or key it in as they will classified ads or the special kinds of news that interests them."(14) Of course, British newspaper readers are not accustomed to seeing (and looking for) the pages upon pages of display ads which are an important part of the content of American newspapers.

TYPES OF INFORMATION

To understand the possible impact of teletext on American newspapers, one must also understand the kinds and breadth of information available on teletext.

Recently a research project of the American Newspaper Publishers Association revealed that a great majority of Americans want newspapers to provide them MUCH MORE consumer information. Not just more, but MUCH MORE.(17)

This ANPA research pinpoints one of the challenges of teletext for American information production. For teletext could make available to every American just about every published bit of consumer information there is. And the viewer could then decide and select for himself, in a matter of seconds, whatever kind of information he wants to see immediately.

Whatever his interest -- autos, television, new appliances, roofing repairs, nutrition, cooking recipes, calorie counting, education courses, road conditions, airline schedules, and you can add the word, "WHATEVER" --absolutely "WHATEVER"-- he could call it up in seconds on his own home information screen.(18)

That is the astonishing information capability of teletext.

Immediate availability of information of your choice is probably the

greatest single attraction for teletext

The writer was in Washington on a Saturday last fall when his university football team was playing an important game. The score was not obtainable, either in the evening papers or by listening to radio or TV broadcasts. But if teletext had been available, it would have been a simple matter to dial the TV screen for Sports, dial the index for Scores, and them select the page on TV that would have shown the score and given the number of the page that carried a brief account of the game. End of frustration!

HOW TELETEXT WORKS

The three British systems of teletext are CEEFAX, ORACLE and VIEWDATA. CEEFAX is owned by the government and BBC and carries no advertising. ORACLE is owned by the Independent Television Authority, expects to earn a profit, and carries advertising.

CEEFAX and ORACLE make use of two TV lines at the top of a home TV screen which are not seen on a properly working TV set. Both CEEFAX and ORACLE transmissions are continuous and may be received and read by anyone who has a TV receiver equipped with a decoder.

A (quote) page (unquote) of teletext information consists of 24 rows of 40 upper and lower case characters which may be displayed in seven colors. There are some graphic facilities to display road maps, weather maps and block headings for new headlines and subject topics. Headlines take space, of course, and in actual practice, the average page is 80 to 100 words long.

Each story can include as much as four pages with present formatting and the maximum story length is now about 400 words. There is no technical reason why story length could not be increased, but the Chief Editor of CEEFAX said there had been no suggestions that longer stories are desired.(19)

Present broadcast teletext programs have a maximum length of eight hundred pages, but again, they are running shorter than their maximum.

In operation, the desired page is selected from an index or from memory by the viewer who chooses page numbers from a small keying mechanism about the size of a rocket calculator. When the page is dialed by the operator, the decoder on the TV set catches the desired page from a continous data stream so that the operator can view it for as long a time as he chooses. When he is finished reading, the operator presses buttons similar to those on a touch telephone and captures another subject or another story.(19) The viewer finds what he wants to read fast.

British teletext does not include print-out facilities for those who might want a hard-printed copy, but such attachments, although expensive, are available now. Radio Shack's April, 1978, sale catalog carried a full page of ads for models of its video display microcomputer with print out attachments and prices ranging from $599 to $3874, depending upon how much "memory" you want to buy. It would be a simple matter to hook this up to a cable transmitting teletext right now, right here in the U.S.A.

CEEFAX and ORACLE offer their viewers choices of about 100 different topics within the present 800-page format.

General topics, most of them with numerous sub-topics, include headlines, news, people in the news, features and prospective news indexed for the news section. The sports section includes headlines, news stories, sports and racing results. One editor told me he thinks newspapers will have to change sports emphasis away from reporting results and develop more background stories because any teletext viewer can call up all the sports results immediately after the result is known.(21)

Weather and travel subjects include weather maps and forecasting maps, plus information about road travel, rail travel, air travel and sea travel. Also

included is information about delays, road repairs, detours and other facts of special interest to travelers.

The entertainment section shows pages of TV programming, film programs and reviews, music and book reviews, information about the theater, and questions and answers from viewers.

Consumerism is important with information about food prices, food availability, farm prices, recipes, science news, police news, and special information on education, farming and gardening.

Finance news includes headlines, the Financial Times index, news of industries, news of companies, a market report, stock price report, exchange rates and information relating to international as well as national finance.

These examples include - considering the numerous sub-topics - probably no more than one-fourth of the information titles in the indexed information guides.

VIEWDATA CONNECTS BY TELEPHONE

VIEWDATA is a different system, developed by the British Post Office.[18] It displays information in the same way as CEEFAX and ORACLE but that is the only real similarity. VIEWDATA connects to the TV set from the telephone and is a part of a two-way communication system the post office supplies. It's stored information is unlimited for all practical purposes. It was demonstrated in Atlanta at "Intelcom 77" in mid-October with two Viewdata terminals connected live to the database in England.

VIEWDATA, being two-way, offers the viewer the opportunity of asking for any information in the post office memory bank. For the market trials in England, about 100,000 pages of information will be available.

Topics in VIEWDATA being offered during the market trial are also varied. They include news, sports, radio and TV, going out (for entertainment) holidays and travel, tourist guide, education (including college of the air), jokes,

quizzes and games, home and family help, advertising, cars and motoring, houses and insurance, jobs and careers, facts and figures, government information, post office services, business facts and figures, industry specialist services, calculation services and numerous sub-heads for each general subject.

The system operates through a classification system much like a ten-digit adaptation of the methods used in the five-digit accounting system of the Institute of Newspaper Controllers and finance Officers.

The viewer chooses a general subject, then a division of the subject, then a subdivision of that division and continues for up to ten steps until he gets to the exact information he desires. In each step, the viewer makes a choice from an index to the next branch of the selection tree. Only five or six steps are needed to offer a precise choice from 25,000 sub-topics, but all ten steps can be performed by the viewer in less than one minute.(6)

VIEWDATA could make life much easier.

Let's assume we are strangers in London looking for something to do tonight We can take our choice from the index of eight or ten different kinds of entertainment in "Going Out". In a moment we can learn all the possibilities and then decide on a play, a movie, a museum showing or an eating and drinking place to visit. And if we pick the latter, we'll be able to choose the menu, the price and the location that most appeals to us.(18)

VIEWDATA offers patrons quick information on most any subject found in libraries or other sources. It could include an entire encyclopedic. It also offers quick access to many kinds of information that often cause great effort and nasty frustrations for people trying to find them.

Let's examine a question of this kind: "Can we adopt a child?"

The viewer dials one or zero in answer to each question as he sees the questions on the screen. As long as his answer is not disqualifying, VIEWDATA

offers another question until the viewer knows whether he can adopt a child or not.[18] In a couple of minutes, the viewer can get the answer to a question he might spend days trying to get answered through conventional means and bureaucrati run-around.

VIEWDATA information providers come from many different parts of industry and government. They include Reuters, Westminster Press and Financial Times as well as consumer organizations, the Tourist Board, the Commodities Exchange, and many others.[18] AND Harte-Hanks Communications of San Antonio, Texas, U.S.A.!

REUTERS INVOLVED

There is also a fourth British system, which operates a lot closer to home. Reuters News Agency is offering its IDR teletext out of New York in conjunction with American cable systems.

Reuters offers two News-view systems, one including financial and sports news, and the other offering general news. The general news channel includes a daily horoscope, Hollywood chit-chat, a sports quiz, pet care, consumer stories and many other topics, including seasonal news such as ski slope conditions and resort weather. The Reuters information is available on demand to viewers who have their sets equipped with retrieval terminals which call up information from an index similar to those on CEEFAX and ORACLE. Some financial firms in the New York area have had the financial-sports system for as much as two years.(2

Broadcast teletext stirs varying degrees of enthusiasm. Television executives have been frequent interested visitors to London studios. Top executives from several large American newspapers have visited the CEEFAX studios, too.

Broadcast CEEFAX does some things very well.

CEEFAX is always the latest word because it is constantly up-dated.

CEEFAX is always available on instant demand with information in the order the viewer chooses to see it.

The maximum s ory length is only four pages or about 400 words.

Some believe the maximum amount of material - 800 pages - that can be stored and transmitted under the present policy and format is insufficient. That criticism does apply to the 800 pages of broadcast CEEFAX but it certainly does NOT apply to the billions of pages theoretically available on the telephone or wired VIEWDATA system.

British broadcast CEEFAX is presently only a small side-line to conventional television. It uses only two of the 625 lines that form the British television picture.

You don't have to be an electronics expert to realize that total capacity of CEEFAX would be up to 300 times greater if the other 623 lines of transmission were teletext instead of television picture.(6)

John Beverley says development in Britain was slowed by two very serious conditions -- the high cost of decoders and the depressed British economy. (Per capita income is less than half the U.S. figure.) But Beverley says neither of these will be deterrents to development in America and that the American propensity for eagerly accepting new ideas will be a positive factor. "Your people buy gadgets like we buy bread, but teletext is no gadget," he said, "It is a tool for instant dissemination of anything people want to know about."(14)

Regarding decoder costs: We know prices for newspaper VDT units have plummeted in recent months as more companies began building them. Pocket calculators cost just a fraction of their price of a few years ago. FCC Commissioner, Robert E. Lee has predicted mass-produced decoders will cost only twenty dollars in a very few years. The public will demand the product and low cost will surely follow.

The future of teletext in America is linked directly to the problem of finding some way to make it pay its way -- to earn a profit for somebody who

provides the service. It would be foolish to assume that nobody is going to do that.

MANY COUNTRIES INVOLVED NOW

Most media observers believe teletext is a British development. That is true, but it is also rapidly becoming international.

Visitors from 75 foreign countries have visited the London studios of CEEFAX.

The CEEFAX Chief Editor wrote in September, "The most exciting devlopment this fall is the international aspect. Australia is moving very, very fast; and pretty deep studies or trials are reported from Sweden, Denmark and Holland."(23)

The German Newspaper Proprietors Assn. and German broadcasting organizations have become bitter rivals for the right to transmit teletext in Germany. Both groups sent teams to England to produce CEEFAX-type shows which they exhibited in late August in the great Berlin International Radio and Television Fair. CEEFAX helped train the newspaper team and both services were transmitted on Berlin TV networks. Now the Germans are arguing about who will get the right to use it, when and how. A similar battle, newspapers vs. TV, is beginning in Australia.

Switzerland is deep into studies of CEEFAX. Swiss journalists compiled CEEFAX pages which were flown to Zurich daily for a Radio-TV exhibition despite the air traffic controller strikes in September.(10)

There is no question that teletext will become international with multi-language transmission over much of western Europe. Some of its enthusiasts believe it offers new opportunities for international cooperation through vastly improved communication.

AMERICAN INTEREST HIGH

BBC's Colin McIntyre says American interest matches growing European involvement in teletext. "Americans have shown more interest than anybody except possibly the Australians," he said.(23)

Many American publishers as well as television executives have shown interest in getting involved in teletext operations. Many have visited the CEEFAX studios. Their representatives have come from some of the most prestigious newspaper organizations in the United States.

Robert Marbut, Chief Executive and President of Harte-Hanks Newspapers, notified this writer on March 28 that his company was going to be deeply involved in the VIEWDATA market trials in England. "We will be purchasing 10 percent of the 100,000 frames in the database and will be an information provider," he wrote. "We hope to test several ideas, including a new system for accessing information in a sort of Dewey Decimal System for accessing electronically stored and microfiche information."(24)

A Philadelphia common carrier in microwave broadcasting, Micro TV, has begun broadcasting a limited teletext service to businesses as a supplement to its regular common carrier service, which includes "Home Box Office" to cable systems in the area. This is really business teletext on a "pay TV" basis, which Bill Gross, company president, has named "American CEEFAX."(5)

The company is prepared to sell a complete computer-broadcast system to other common carrier microwave companies for $100,000. It also offers decoders needed to modify TV sets to receive teletext for $500 each.

VIEWDATA opened a New York sales and promotion office in March, according to information sent to the writer by John Beverley.(26)

ADVERTISING OUTLOOK

Display advertising presented one of the more optimistic viewpoints of British publishers in appraising future competition between teletext and newspapers. This optimism stems from British belief that all advertising is "an intrusion" upon the desire for information by a reader or viewer.(2)

This belief is partly based upon the failure of British newspapers to develop the huge volume of advertising found in American and Canadian newspapers. So the homemaker in England is not accustomed to looking for those big ads from K-Mart, Penneys, Sears, Macy's or other large department stores represented in American newspapers. (A VIEWDATA executive explained that huge stores like Selfridge's and Harrod's in London feel they don't need much advertising because British people go to those stores by force of habit.)(18)

For that reason British broadcasters and newspaper executives overlook the fact that American women -- and men, too -- are conditioned to look for advertising as well as news.

A recent survey revealed 34 kinds of newspaper information which people would like to see increased in newspapers.(17) Would you believe that "Ads of interest" ranked third highest on the list of 34 types of information people wanted more of? Two-thirds of them, both old and young, wanted more newspaper advertising. Why? Because advertising provides keys to the quality of life, and that pursuit of happiness to which Malcolm Muggeridge has said "we Americans are nationally dedicated."

So there is ample research reason to think American viewers would call up advertising pages if they were classified by commodities and as easy to find as the indexed news articles.

This writer is sure his own wife would call up ads for department stores, groceries, and clothing stores for reading just as she would the news. And if

somebody mentioned returning to London, she would probably look up the classification for vacation trips, as well. Most newspaper advertisers want their ads to be grouped with others offering similar products, and VIEWDATA can do this easily.

British publishers are particularly apprehensive about the adaptability of teletext to classified advertising. They foresee teletext making serious inroads into classified revenue, because the viewer can immediately eliminate from his sight and consideration everything being advertised except the products he is interested in buying.

Teletext can do the same thing for display advertising. It can be classified for men's wear, women's wear, meat, new cars, vegetables, garden tools, and again -- WHATEVER. And with capital requirements only a fraction of the huge sums required for printing newspapers or magazines, it seems logical to believe the advertising capability will be developed. In England, ITV's ORACLE is working on it now.

Some American publishers who have investigated teletext believe its chief function, in connection with newspaper operations, may be to enable newspapers to provide specialized information for small groups of viewers. They see it as a possibility for helping them to achieve the "tailored newspaper" by using teletext to present supplemental information to satisfy special interests.

But the fact is that nobody in his right mind would try to prophesy all the forms the new medium will take. A recent letter to Editor and Publisher[30] pointed out that radio and television had damaged magazines far more than newspapers in the past and predicted that newspapers will survive this challenge as they have earlier ones.

THE BEST PROBABILITY

Probably the best guess is that we must accept the idea that teletext is already here and that it is going to be another medium of communications in addition to radio, television, magazines, handbills, shoppers and newspapers. The newspaper business, with a great recent record of adapting electronics to its own operations, is probably the best bet as the industry most likely to use teletext well and wisely for its own interest.(30)

Anybody, not already in the broadcasting business, would have to get a license through the Federal Communications Commission to begin broadcasting teletext signals in the United States.

The first application for broadcast teletext is for permission to broadcast a limited number of signals, similar to the British system, by KSL-TV in Salt Lake.(27) The station management asked permission to begin transmitting teletext on lines 15 and 16 of the regular TV picture signal but the request had not been acted upon in early April.

The FCC has acted favorably upon a request to allow use of one line of the vertical blanking interval of TV pictures for captioning for deaf persons seeing TV pictures.(28) This would allow the broadcaster to transmit captions in teletext along with the picture. This is exactly the way teletext began operation in Britain -- as an aid to blind persons in understanding television.

There is, however, a fundamental difference between government involvement in Great Britain and in the United States. In Britain, the government takes the initiative in pushing new developments; but in the United States, private capital must do that.

Wallace E. Johnson, Chief of the Broadcast Bureau of the FCC, stated in a letter to this writer on April 7, 1978: "It is highly unlikely that the Commission would, on its own initiative, undertake embarking on a rule making

proceeding (involving teletext). We are inclined to await the filing of a formal petition requesting initiation of such a proceeding, since without a petition, and the showing which must be made in support of the requested action, we have little to go on to indicate the degree of interest, the potential viability, the extent of need and the public interest considerations pertaining to such a service."(29)

Johnson's statement tells the story in terms of unknown delay. Nothing much is going to happen until somebody decides to file an application and fight the red tape that restricts such actions. Some who are truly interested will wait.

The writer knows of one instance where the wait-and-see attitude has already been adopted by a California group with strong interest and confidence in the commerical possibilities. Despite having sufficient capital and adequate civic backing, the group has decided to wait.

So as it has been in the past for cable TV, it appears to be probable in the future for teletext. Its future will wait for the FCC to decide upon its time, place and circumstance.

NOTES

1. Personal interview with John Beverley, Chief Operating Officer, Westminster Press, Newspaper House, London, England, May 12, 1977.

2. Personal interview with George Cooper, President, Thames Television, London, England, May 9, 1977.

3. Viewed in demonstration at BBC CEEFAX Studios, BBC Television Centre, London, England, May 11, 1977.

4. CEEFAX Information Bulletin, BBC Television Centre, London, England.

5. Multicast Newsletter, Rockville Center, N.Y., Dec. 2, 1976.

6. Personal interview with Gerald Chevin, President, VideoCraft, Assett House, London, May 12, 1977.

7. Personal interview with Garry Garrard, Texas Instruments, Bedford, England, May 10, 1977.

8. Telephone interview with Robert Loman, Import Manager, Texas Instruments, Dallas, Texas, April 12, 1977.

9. Editor and Publisher, page 8, Dec. 3, 1977.

10. Letter to writer from Colin McIntyre, editor of CEEFAX, Sept. 22, 1977.

11. TV Guide, page 35, July 2, 1977.

12. Report of the committee on the future of broadcasting, Chairman, Lord Annan, issued in March , 1977.

13. Letter to writer from J. Alan Shanks, Technical Officer for The Newspaper Society, Whitefriars House, London, March 21, 1978.

14. Personal interview with John Beverley, Newspaper House, London, May 13, 197

15. Personal interviews with several publishers, London Press Club, May 11. 197

16. Personal interview with Geoffrey Hughes, Editor of ORACLE, Weekend Televisio South Bank Television Studio, London, May 6, 1977.

17. ANPA News Research Report No. 1, April 8, 1977.

18. Personal interview with R. D. Bright and Mandy Pritchett, promotion executive VIEWDATA, British Post Office, Lutyens House, London, May 11, 1977.

19. Personal interview with Colin McIntyre, Editor of CEEFAX, BBC Television Cent London, May 9, 1977.

20. Spring sale catalog issued by Radio Shack throughout the United States, page 10, April 9, 1978.

21. Personal interview with Ken Burnell, Assistant Editor, ORACLE, Weekend Television, London, May 6, 1977.

22. Personal interview with Paul F. Gerken, Program Director, Cablevision, Jericho, N.Y., May 18, 1977.

23. Letter to writer from Colin McIntyre about holiday program developments, Dec. 22, 1977.

24. Letter to writer from Robert Marbut, President, Harte-Hanks Communications, San Antonio, Texas, April 4, 1978.

25. Telephone interview with Bill Gross, President, Micro TV, Philadelphia, Pa., Jan. 6, 1978.

26. Letter to writer from John Beverley, London, with copy of teletype message from VIEWDATA announcing opening of New York office, April 2, 1978.

27. Personal interview with Neal K. McNaughten, Asst. Chief, Broadcast Bureau, FCC, Washington, D.C., Jan 27, 1978.

28. Docket No. 20693, FCC Report and Order concerning Commission's Rules and Regulations on Captioning for the Deaf. Released Dec. 20, 1976.

29. Letter to writer from Wallace E. Johnson, Chairman, Broadcast Bureau, FCC, Washington, D.C., April 7, 1978.

30. Letter to Editor of Editor and Publisher (from Kenneth Edwards), page 5, Dec. 17, 1977.